PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Shaft Drives for Motorcycles

We, INDIAN MOTOCYCLE COMPANY, a corporation organized under the Laws of the State of Massachusetts, United States of America, of 837, State Street, Springfield, Massachusetts, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an improvement in motorcycles, and more particularly to a novel arrangement of the motor and the transmission and driving elements of such vehicles with respect to each other and the frame of the vehicles.

Among the objects of the invention are the more efficient use of shaft drives as distinguished from chair drives, shortened wheel bases, or the more efficient use of the space afforded by a given wheel base, and improved motor cooling.

In order to lower the center of gravity and secure desired stability, the motor is placed as low in the frame of the motorcycle as possible while providing the necessary road clearance. This practice brings the crank shaft of the motor below the level of the axle of the rear wheel of the motorcycle, to which power must be transmitted from the motor.

A shaft drive has many advantages, well known to the art, as compared with chain drives, and our invention makes possible a much more extensive use of the shaft drive in motorcycle construction and without sacrifice of stability or the use of excessively long wheel bases. Also, as later pointed out, it permits a more efficient use of V-type motors.

According to the invention there is provided a motorcycle in which the crank shaft of the motor is below the level of and at right angles to the axle of the rear wheel which it drives through a power train comprising a clutch and a speed change transmission arranged in side by side relationship, the forward end of the clutch being connected to the motor crank shaft and the rear end of the clutch being connected by a laterally directed drive to the rear end of the transmission, the transmission tail shaft being substantially in the plane of the rear axle and being connected thereto by a horizontal drive shaft including a universal joint.

The invention also resides in a motorcycle in which the crank shaft of the motor is below the level of and at right angles to the axle of the rear wheel which it drives through a clutch extending rearwardly of a flywheel at the rear of the motor crank shaft and through a speed change transmission, arranged in side by side relationship with the clutch, the rear end of the clutch being connected to the rear end of the transmission which extends forwardly but terminates at the rear of the transverse plane of the flywheel, and the tail shaft of the transmission being connected to the rear wheel by a drive shaft including a universal joint.

In the accompanying drawings,

Fig. 1 is a side elevational view of a four cylinder motorcycle embodying our invention, parts being broken away;

Fig. 2 is a sectional view, on a larger scale, taken substantially on line 2—2 of Fig. 1, showing the manner of connecting the crank shaft assembly to the transmission assembly;

Fig. 3 is a sectional view substantially on line 3—3 of Fig. 2;

Fig. 4 is a sectional view substantially on line 4—4 of Fig. 2; and

Fig. 5 is a view similar to Fig. 2, indicating the application of our invention to a V-type motor.

Referring to the drawings, the frame of the motorcycle is generally indicated at 10. A four cylinder motor, with its cylinders in line, is shown at 11. The motor 11 is placed as low in the frame as is consistent with providing the safe minimum road clearance *a* (Fig. 1), thereby securing a low center of gravity, and the maximum stability. This position of the motor relative to the frame brings the axis of rotation to the motor crank shaft, indicated at 12, a distance *b* below the level of the axle 14 of the rear wheel. In Fig. 2 the dotted lines 12^1 and 14^1 indicate the levels respectively of the motor shaft and rear axle. This is